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NOTES AND LITERATURE

EVOLUTION AND HEREDITY

Darwinism To-day.[1]—"Charles Darwin was the foremost scientific man of the entire nineteenth century, and I think he must also be termed the greatest Englishman of his time. Even the very few persons who would assign to the famous naturalist a less solitary preeminence must admit that his ability was of the highest order." Such an estimate of Darwin, recently expressed by Professor Minot, is seldom presented in discussions of *Darwinism*. Those using this term must explain that they do not mean the origin of coral islands through subsidence of the ocean floor, or the overturning of the earth by worms, or the adaptations of plants to cross-fertilization, or even organic evolution, but that they have in mind natural and sexual selection and perhaps also pangenesis. The recent book by Professor Kellogg is a discussion of the various theories of evolution.

The first chapter introduces the reader to the "philosophic turmoil and wordy strife," very little of which is said to have found its way into current American literature. In the second chapter it is stated that the "millions of kinds of animals and plants can have had an origin in some one of but three ways; they have come into existence spontaneously, they have been specially created by some supernatural power, or they have descended one from the other in many-branching series by gradual transformation. There is absolutely no scientific evidence for either of the first two ways; . . . If such a summary disposal of the theories of spontaneous generation and divine creation is too repugnant to my readers, . . . then my book and such readers had better immediately part company; we do not speak the same language."

There is little depth in such a statement. It will be generally conceded that existing animals have descended from the past, and that at some remote time one or many forms first appeared upon the earth. Some will say that they appeared spontaneously and others that they were a divine creation, just as present occurrences are regarded by some as spontaneous and by others as divinely ordained. However, that the debate should not be checked by philosophy, the author hastens to consider the various attacks on ''Darwinism,'' the defense, and finally other theories which may be substituted. His style is breezy, such as Englishmen describe as American, and New Englanders as Western.

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[1] Kellogg, V. L. Darwinism To-day. A discussion of present-day scientific criticism of the Darwinian selection theories, together with a brief account of the principal other proposed auxiliary and alternative theories of species-forming. New York, Henry Holt and Company, 1907. 403 pp. $2.00.

''Sexual selection is one of Darwin's supporting theories which has nearly gone quite by the board.'' In support of this Mayer's convincing experiments with *Callosamia promethea* are fully described. ''If there is any moth species in which the colors and general pattern of the male ought to be readily obvious to the female . . . it is this species.'' Mayer found that the females did not prefer normal males to those from which the wings had been clipped, or to those on which the red-brown wings of the female had been fastened in place of their own black ones of very different shape. The author believes that a satisfactory explanation of sexual dimorphism is yet to be formulated.

The importance of selection in producing mimicry in color patterns is accepted, though somewhat doubtfully. Professor Kellogg says of Basilarchia—''But thanks to its perfectly mimicking color-pattern, it wings its deceitful way unmolested. There is huge usefulness here, and selection can well be the steadfast maintainer of the viceroy's dissimulation.'' The marring of the resemblance by the dark streak across the hind wings is noted but not accounted for; the ''over-refined'' resemblance of Kallima to a leaf is called ''absurd.'' The author leaves his reader to draw his own conclusions in regard to mimicry and many other problems. Thus Bumpus is cited to show that a storm destroys the physically defective sparrows, and Kellogg shows that a drought destroys the fit and the unfit fish. The reader must judge whether it is variation or ''hard luck'' which usually brings destruction.

Three theories alternative with selection are presented, namely, ''Lamarckism,'' orthogenesis, and heterogenesis (mutation). Darwin is cited in favor of all three. Lamarck's conception of evolution is ''a great thought and a clear one,'' but it lacks experimental support. Likewise for the theory of heterogenesis as capable of explaining species formation as a whole, the author finds an "extreme meagerness in quantity of the real scientific evidence." He declares that no indubitable cases of species-forming or transforming have been observed.

"The theories of orthogenesis of the general type exemplified by Eimer's are directly in line with the spirit of modern biological methods and investigations. They rest on the assumption that physico-chemical factors produce direct effects on the plastic organism, and that such effects . . . modify or control evolution." Any tendency, such as is shown by Nägeli, to substitute a "mystic vital force" for the "physico-chemical factors" receives the author's severe censure; yet except as one emphasizes the complex and unknown internal factors rather than the simpler conditions of environment, these conceptions are not far apart. "Nägeli believes that animals and plants would have developed about as they have, even had no struggle for existence taken place, and the climatic and geologic conditions been quite different from what they actually have been." Much more could be said in favor of orthogenesis than Professor Kellogg records.

In the concluding chapter it is stated that "Darwinism, then, as the natural selection of the fit, the final arbiter in descent-control, stands unscathed, clear and high above the obscuring cloud of battle. . . . To my mind every theory of heterogenesis, of orthogenesis, or of modification by the transmission of acquired characters confesses itself ultimately subordinate to the natural selection theory." Yet before closing, Professor Kellogg returns to a discussion of orthogenesis as "a determinate though not purposeful change."

After each chapter there is an appendix containing considerable citations from works on evolution. The volume should prove valuable to students; we hope that they will not lay it aside with the author's remark "*Kurz und gut*, we are immensely unsettled."

F. T. L.

The Effect of Environment upon Animals.—It is well known that if the pupæ of certain butterflies, *e. g.*, Vanessa or Pyrameis, be subjected to extreme cold (0° to —20° C.) many of the adults will be aberrant in color pattern. However, if they be subjected to extreme heat (42° to 46° C.) the same aberrations